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EXAMINER	
MCGUTHRY BANKS, TIMA MICHELE	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
05/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,550	SELLAN, ROMANO	
	Examiner	Art Unit	
	TIMA M. MCGUTHRY-BANKS	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *9-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/26/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-15 are currently amended and Claims 16-18 are new.

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) s 1-8, drawn to a method.

Group II, claim(s) s 9-18, drawn to an apparatus.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the same technical feature, the tunnel, hearth, weighting means, means to detect temperature and means to regulate speed, is taught by US 6,004,504 and RU 2.082,763 as described further in this office action.

During a telephone conversation with Tony Venturino on 21 May 2008 a provisional election was made without traverse to prosecute the invention of I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-18 are

withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy (US 6,005,504) (Vallomy '504) in view of RU 2,082,763 (RU '763).

Vallomy '504 teaches an improved control of a continuous electric arc furnace as shown below in Fig. 1 and 2:

Fig.1

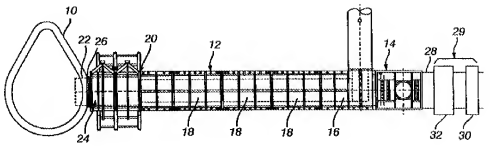
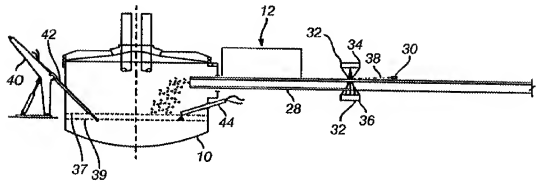
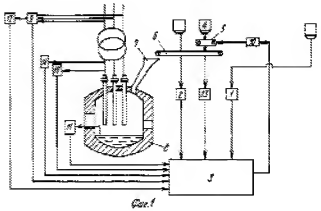


Fig.2



The system includes a preheating chamber 12 for introducing charge materials (column 3, lines 40-44). Fig. 2 shows the electrodes and hearth with a roof. The mass of materials introduced into the furnace and the temperature is determined (column 2, lines 38-60). However, Vallomy '504 does not disclose weighing the furnace periodically and detecting and regulating as in Claim 1.

RU '763 teaches a control process of continuous charging and melting of iron-rich pellets in electric arc steel making furnaces as shown below in the figure:



In the inter-melting period, signals from a scrap weight sensor (1) and from a weight sensor (2) of additional materials pass to a control unit (3) and are recorded. During continual loading of metallized pellets from a bunker (4) along conveyors (5,6) into a funnel (7) and their melting in a furnace (8), the signal from a sensor (9) of consumed active power passes to the control unit. Depending on the magnitude of the active power, the control unit selects the rate of loading of the pellets and passes a corresponding signal to the actuating mechanism of a loading system (10) (Derwent abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the control process of RU '763 with the process of Vallomy '504, since the control process of RU '763 results in better stability of the lining of the furnace, maintained melting efficiency, and reduced consumption of electrodes and electricity (abstract).

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy '504 in view of RU '763 as applied to claim 1 above, and further in view of Gulden, Jr. et al (US 5,099,438).

Vallomy '504 in view of RU '763 discloses the invention substantially as claimed. However, Vallomy '504 in view of RU '763 does not disclose varying the electric power as in Claim 2, interrupting loading to the furnace before tapping for an interval of between about 8 and

12% of the overall time of the cycle as in Claim 3, interrupting the feed of electric power before tapping as in Claim 4, or increasing the minimum value of the electric power. Gulden, Jr. et al teaches a method for on-line monitoring and/or control of an electric arc furnace utilizing a method of data transfer between a programmable logic control and a microprocessor comprising monitoring data from the furnace over a fixed time cycle (abstract), as shown below in Figure 1:

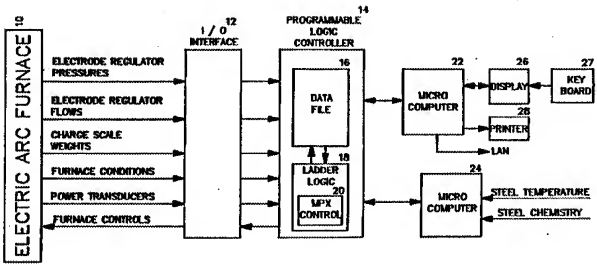


FIGURE 1

Table 5 shows the variation of the power in MW and MWHr. Vallomy '504 teaches that the operation of an electric arc steelmaking furnace can be an intermittent operation (column 1, lines 18-20). Charging and power input is interrupted for the tapping procedure (lines 31-34). Table 5 shows the time the heat was on for the entire process. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the monitoring and/or control process of Gulden, Jr. et al with the variation in power for loading and melting Vallomy '504 in view of RU '763, since Gulden, Jr. et al teaches that this monitoring and control process provides better control of the electrical energy required, provides better control of the consumable

materials, provides better control of good steel making practices in operating the furnace, and provides quality control records of the entire process and the process parameters (column 2, lines 11-20). Specifically regarding the minimum and maximum electric power, Gulden, Jr. et al exemplifies minimum and maximum power usage in Table 5. Regarding the power variations, a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation; therefore a *prima facie* case of obviousness exists. See MPEP § 2144.05 II B.

Regarding Claim 7, Vallomy '504 teaches that charging and power input is interrupted for the tapping procedure (column 1, lines 34-36).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy '504 in view of RU '763 and Gulden, Jr. et al as applied to claims 1 and 2 above, and further in view of Vallomy (US 4,564,388) (Vallomy '388), Hyde (US 3,772,000) et al, and Engledow (US 4,010,026).

Vallomy '504 in view of RU '763 and Gulden, Jr. et al discloses the invention substantially as claimed. Vallomy '504 further teaches that it is important to maintain a steel bath level that is neither too low not too high. Maintaining an appropriate heel level containing available heat results in immediate melting of metallic charge (column 1, line 66 to column 2, line 4). However, Vallomy '504 in view of RU '763 and Gulden, Jr. et al does not specifically disclose that the molten heel is 30-40% as claimed. Vallomy '388 teaches a molten heel of 40-50% (column 4, lines 57 and 58). Hyde teaches that if a low ratio of heel to new scrap is low, a greater net production of new steel per heat will result (column 7, lines 31-40). Engledow

teaches that a hot-heel practice, that is, leaving a residue of molten metal behind in the furnace at the end of the first heat to start the next cycle. This eliminates the losses in both time and heat (column 3, lines 62-66). The claimed percentage of molten heel is an obvious design choice, since the prior art teaches that a molten heel is desirable in the process of melting a metallic charge such as scrap. A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation; therefore a *prima facie* case of obviousness exists. See MPEP § 2144.05 II B.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vallomy '504 in view of RU '763 and Gulden, Jr. et al as applied to claims 1 and 2 above, and further in view of Wunsche (US 4,679,773).

Vallomy '504 in view of RU '763 and Gulden, Jr. et al discloses the invention substantially as claimed. Though Vallomy '504 in view of RU '763 and Gulden, Jr. et al teaches interrupting electric feed to the electrodes and restoring power to the electrodes, Vallomy '504 in view of RU '763 and Gulden, Jr. et al does not disclose the tapping steps a) - d) as claimed. Wunsche teaches an assembly for tapping liquid metal from an electric arc furnace as shown below in Fig 1.

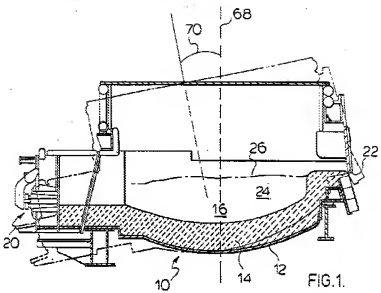


FIG.1.

The tapping assembly includes a refractory member having a tapping passage there through (column 2, lines 22-26). It is well known in the art that refractories have high melting points. The impulse jet can also be used to clean passage 34 of residual liquid metal or slag that may remain in passage 34 after discharge of metal (shown in Fig. 3) (column 4, lines 30-32). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the tapping method as taught by Wunsche in the method of Vallomy '504 in view of RU '763 and Gulden, Jr. et al, since Wunsche teaches that is process provides an essentially slag-free discharge of liquid metal, access to the tap hole can be readily and safely opened and closed, and a means for readily and safely displacing a temporary plug of refractory material from the tap hole, and for discharge of liquid metal from the furnace.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMA M. MCGUTHRY-BANKS whose telephone number is (571)272-2744. The examiner can normally be reached on M-F 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/T. M. M./
Examiner, Art Unit 1793
29 May 2008